



Audit

The current management of tibial fractures: are clinical guidelines effective?

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Background: The production of clinical guidelines is increasing and will continue to do so with the introduction of clinical governance. In 1997, the British Orthopaedic Association (BOA) and the British Association of Plastic Surgeons (BAPS) published joint guidelines on the management of open tibial fractures. It is not known whether these guidelines reached their target audience, or indeed influenced clinical practice.

Methods: We determined the effectiveness of these guidelines by sending a postal questionnaire survey to 172 orthopaedic surgeons.

Results: Only 57% of consultants were aware of the guidelines, 70% of registrars and 25% of staff grades. Less than 29% of orthopaedic consultants would choose to consult the plastic surgical team pre-operatively in the management of an open tibial fracture and only 43% would seek plastic surgical involvement at all. The primary aim of increasing multidisciplinary communication has not been achieved.

Conclusions: The awareness of, and adherence to, these guidelines is sub-optimal. This clearly has implications for both the future management of open tibial fractures and the further production of guidelines.

Key words: Open tibial fractures – Guidelines – Multidisciplinary care

The production of national guidelines on the management of specific conditions is a trend that seems set to continue following the introduction of clinical governance. In 1989, a booklet proposing guidelines for the management of open tibial fractures was sent to members of the British Orthopaedic Association (BOA) and British Association of Plastic Surgeons (BAPS). This was revised and re-issued in 1997.¹ The guidelines were written by a working party of 5 orthopaedic and 3 plastic surgeons. Their principal aim was to encourage early and optimal management of this complex and often badly treated condition and to increase early co-operation between

orthopaedic and plastic surgeons. The guidelines start with the epidemiology of open tibial fractures and continue with advice on history and examination, with particular regard to the wound and the presence of compartment syndrome, vascular and nerve injury. Specific advice is given on the communication between orthopaedic and plastic surgeons, pre-operative management and operative technique including: wound extension, debridement and lavage, fracture stabilisation and wound closure. The final part of the guidelines is dedicated to fasciotomy and soft tissue reconstruction. The aim is to encourage an adequate fasciotomy, whilst

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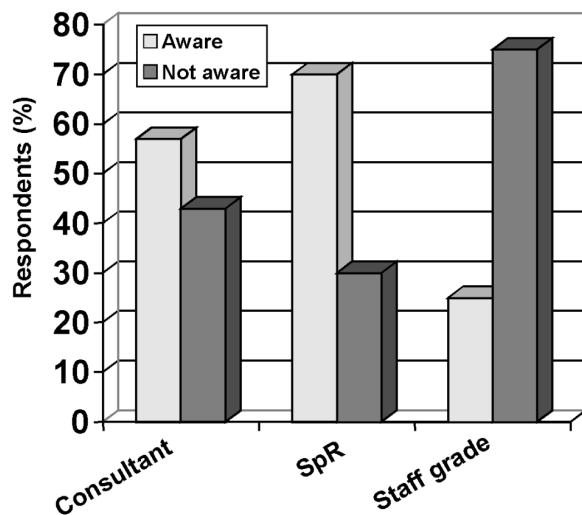


Figure 1 Awareness of the national guidelines by grade.

avoiding skin incisions which would limit the choice of potential reconstructive flaps.

The aim of this survey was to determine whether these guidelines have been effective. In order to be effective, guidelines must not only be distributed to the appropriate people, but they must be adopted into clinical practice. If they have not achieved their stated aims, we must question why, ascertain the reason for their failure and try to address these areas.

Methods

All orthopaedic surgeons within one region were sent a postal questionnaire to establish their current practice regarding the management of tibial fractures, compartment syndrome and their level of knowledge regarding the BOA guidelines. A total of 172 questionnaires were sent to consultants, specialist registrars (SpRs) and staff grade surgeons at 25 centres (68 consultants, 104 SpRs/staff grades). The survey was divided into three sections. Section one determined the demographics of the unit and the location and level of communication with the local plastic surgical team. Section two related to the initial management of the open wound and experience with microvascular and plastic surgery techniques. Section three was concerned with the management of compartment syndrome. Respondents replied to a range of questions designed to see if they managed patients in accordance with the guidelines as well as their knowledge of each subject.

Results

A response rate of 64% was achieved (110/172). Of these, 17 were incomplete (in the majority of these cases the surgeons

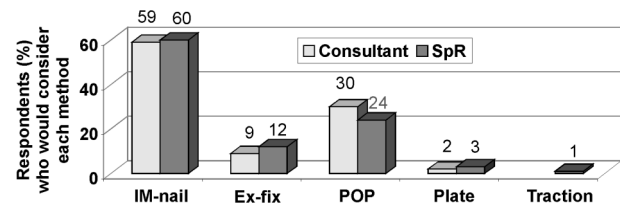


Figure 2 Methods of stabilisation - closed.

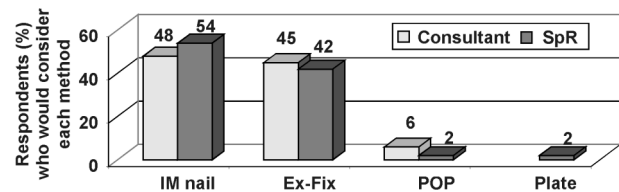


Figure 3 Methods of stabilisation - open.

did not have a trauma commitment). Of consultants, 84% (51/61) were BOA members, 60% (27/45) of SpRs and only 25% of staff grades. Awareness of the guidelines was as follows: 57% of consultants, 70% of SpRs and 25% of staff grades (Fig. 1).

Number of fractures treated and methods of stabilisation

Open tibial fractures were seen less frequently than closed fractures. The modal number seen was 1–5 open and 6–10 closed fractures per year. Intramedullary nailing was approximately twice as popular as plaster cast (POP) in the management of closed fractures. For open fractures, nailing and external fixation were equally used (Figs 2 & 3). Interestingly, only a third of all respondents, regardless of grade, used the traction table to aid reduction whilst performing intramedullary nailing.

Initial wound management

Pulse lavage was the preferred method of intra-operative irrigation in open tibial fractures (84% of consultants and 80% of SpRs). The volume of irrigation fluid used was in the range 1–15 l (mean, 6 l).

Only 12% of consultants and 7% of SpRs aimed to achieve immediate skin cover. However, 98% of consultants and 97% of SpRs aimed to achieve skin cover in less than 5 days.

Overall, 57% of consultants and 71% of SpRs said that they would always refer to a plastic surgeon. Of the consultants, 44% would involve the plastics team pre-operatively, 43% within 24 h, 9% within 48 h, 2% within 5 days and 2% within 7 days. Of SpRs, 61% would involve

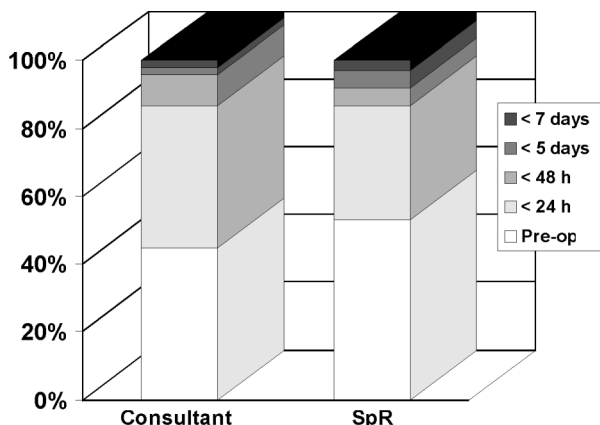


Figure 4 Timing of referral to plastic surgeons

the on-call plastics team pre-operatively, 24% within 24 h, 5% within 48 h, 7% within 5 days and 3% within 7 days (Fig. 4). The majority of those who did not always refer to a plastics team preferred the use of a split skin graft (61%). The remainder chose either free or local flaps, full-thickness graft or considered all of these. Of those who did not refer, only 43% had microvascular or plastics training. Overall, 34% of consultants and 36% of the SpR group had some form of microvascular training.

Compartment syndrome

Only one respondent thought that the palpation of distal pulses was a reliable way of detecting compartment syndrome. However, 13% of consultants and 3% of SpRs did not know how many compartments there were (Fig. 5). With regard to monitoring of compartment pressures in the unconscious patient, 19% of consultants and 43% of SpRs said that they would routinely perform this, although a surprisingly large 34% of consultants and 17% of SpRs had no method available to do this with – 49% had either a commercial or continuous monitoring system. In the study group, 82% of SpRs and 55% of consultants correctly stated that diastolic pressure should always be at least 30 mmHg

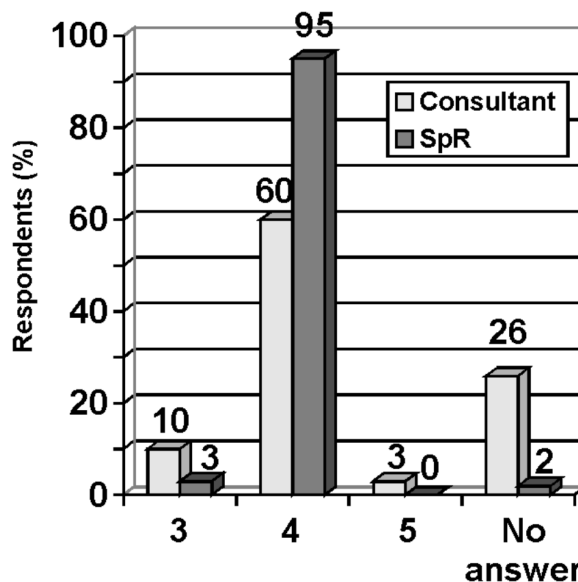


Figure 5 Number of compartments decompressed

greater than the compartment pressure, although only 32% of consultants and 38% of SpRs were aware of the true incidence of compartment syndrome (Fig. 6). The majority of registrars (52%) overestimated the incidence in open fractures at 15–20% (the actual figure is much lower and has been reported as 6% in Gustilo type III fractures²).

Discussion

Open tibial fractures result from severe high velocity trauma and are commonly associated with other significant injuries.² It has long been recognised that these patients require skilled senior surgical management with close multidisciplinary communication and early operative intervention to avoid long-term morbidity.³ Open tibial fractures occur with a stated frequency of between 30–44 patients per 100,000 accident and emergency attendances.⁴ This is, on average, 15–18 open tibial fractures a year for an average district general hospital with the more severe

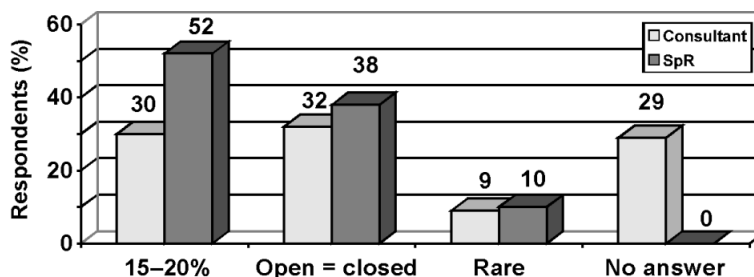


Figure 6 Incidence of compartment syndrome.

grades of injury occurring less frequently.⁵ In our study, 60% of consultants saw between 1–5 open tibial fractures per year with less than 20% seeing more than 6 a year. The relative rarity of these injuries coupled with the importance of delivering high standards of care in the management was highlighted during a combined meeting of the BOA and BAPS in 1991. Following this meeting, initial guidelines were drawn up and subsequently published in 1993³ with the primary aim of encouraging early co-operation between the two specialities and raising the current standards of treatment. In 1997, these guidelines were revised and re-issued;¹ this booklet claimed partial success from the original publication, but with no supporting evidence for this conclusion. It did, however, recognise that optimal management was still not uniformly practised across the UK and laid out clear, concise guidelines to improve care. These guidelines aimed to address three main areas: (i) to improve the understanding of complex tibial fractures; (ii) to increase multidisciplinary co-operation; and (iii) to encourage early transfer to a specialist centre if local facilities are not optimal.

This study has shown a worryingly low awareness of the guidelines, particularly among senior surgeons. Some surgeons appear to have an inadequate knowledge base with which to be caring for these complex injuries (*e.g.* 13% of consultants did not know how many compartments there were). The concepts of early plastic surgical involvement and appropriate early transfer in order to achieve wound cover within 5 days do not seem to have been adopted. Clough and Bale have reported similar findings and from a unit that had plastic surgical teams on site.⁵

If this study is taken as representative of the whole of the UK, the guidelines appear to have failed in their main objectives. It is important to note that these standards of care have been accepted and recommended by the recent joint report on *Better Care for the Severely Injured*⁶ and will, therefore, act as a baseline national standard. The report states that trusts will be audited and expected to deliver care to this level; it further stresses the importance of appropriate transfer and multidisciplinary care.

Before further guidelines are produced, we must address how to distribute them, as well as how to maintain an adequate level of awareness, before attempting to audit their success.

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